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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,105	10/31/2003	Yasunaga Miyazawa	117383	1446

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EXAMINER	
LEE, GINA W	

ART UNIT	PAPER NUMBER
2626	

MAIL DATE	DELIVERY MODE
12/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/697,105	MIYAZAWA, YASUNAGA	
	Examiner	Art Unit	
	Gina W. Lee	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-8 and 11-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-8 and 11-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the office action from 8/8/2007, the applicant has submitted an amendment, filed 9/21/2007, amending claims 1 and 6, while adding claims 17 and 18, and arguing to traverse the art rejection based on the limitation regarding acoustic model creation by superposing two different types of noise data with speech data. The applicant's amendment and remarks have been carefully considered, but they are not persuasive and do not place the claims in condition for allowance. Accordingly, this action has been made FINAL.

2. The previous objections directed to this Applicant's claims not discussed in this Office Action have been withdrawn by the examiner.

Change of Art Units

3. Please note that the examiner has changed art units, which was formerly 2609. The Examiner's new art unit is 2626.

Response to Arguments

4. Applicant's arguments filed on September 21, 2007 have been fully considered but they are not persuasive.

5. The applicant asserts on page 7:

> Deng fails to disclose or suggest an acoustic model creating method including creating plural types of noise-superimposed speech data by superimposing at least

> two different types of noise data on standard speech data, as recited in independent claim 1 and similarly recited in independent claim 6.

As no mention is made in the claims of any specific number of resulting types of noise-superposed speech data, this is open to multiple interpretations, including the situation where two different types of noise exist (call them Noise A and Noise B). In this scenario, we can conceivably produce acoustic models formed from the combinations of speech data with Noise A, speech data with Noise B, and speech data with Noise A and Noise B. As to the first two situations, Deng teaches the creation of multiple acoustic models from different sets of training data *(col. 12, lines 36-37)* derived from different types of noise *(col. 11, lines 9-11)* and thus this interpretation is clearly taught by Deng. In addition, Deng also teaches the third situation of using different sets of training data in combination *(col. 12, lines 36-38, different sets of training data, different noise reduction techniques or combinations of both are used to train acoustic models)*. Therefore, it is maintained that Deng teaches "creating plural types of noise-superposed speech data by superposing at least two different types of noise data on standard speech data".

6. The applicant further asserts on page 7:

> Deng discloses a method and apparatus for training and using a pattern recognition model for noise reduction. In col. 11, lines 2-14, Deng discloses that training data can be collected as associated with a different type of noise. The type of noise may contain air conditioning noise or background speech noise. Deng merely discloses that the training data can be populated by noise from an air conditioner or other background speech noise. However, **Deng fails to disclose a superimposing step of two different types of noise data with any speech data.** [emphasis added]

7. The specific limitation of claims 1 and 6 reads "creating plural types of noise-superposed speech data by superposing at least two different types of noise data on standard speech data". Therefore, applicant has not claimed superimposing two different types of noise data with speech to create an acoustic model (singular), if this is the applicant's intent. Please see the above paragraphs for discussion of the interpretation of the claim. Furthermore, Deng does teach adding different sets of noise training data in combination *(col. 12, lines 36-38)* to "clean" speech signals to create acoustic models. *(col. 6, lines 38-44)*. Therefore, the rejection is maintained.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1, 2, 5-8, 11-13, and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deng et al. (US 6,876,966).

10. With respect to independent **claim 1** and **claims 15-16**, Deng teaches an acoustic model creating method for performing speech recognition within a vehicle having noise *(column 6, line 37, noisy environment may be a car; column 10, line 62, noisy environment may be an airplane)*, the method comprising:

- collecting various types of noise collectable within the vehicle having noise *(column 6, lines 40-44 noise is recorded from selected noisy environments)*;
- creating plural types of noise data by classifying plural types of collectible noise *(column 11, lines 2-13, each set of noise training data is associated with a different type of noise)*;

- creating plural types of noise-superposed speech data by superposing at least two different types of noise data on standard speech data *(figure 8, column 6, lines 32-44, noise is added to the "clean" speech signals; column 12, lines 36-48, different sets of training data and combinations of such are used)*;
- creating plural types of noise-removed speech data by performing a noise removal process on the plural types of noise-superposed speech data *(figure 3, column 6, lines 45-47, noise reduction module applies one or more noise reduction techniques to the noise training data (302))*; and
- creating plural types of acoustic models using the plural types of noise- removed speech data *(column 6, lines 53-64, acoustic model is trained with "pseudoclean" training data (304); column 12, lines 36-48, different sets of data are used to train multiple acoustic models)*.

but is silent as to the precise sources of the noise. However, Deng states that the raw training data includes anticipated additive noise from a noisy environment such as a car *(column 6, lines 32-44)*.

The examiner posits there are many sources of noise, both internal and external to a vehicle, which would be well known to a user of a speech recognition system intended for use in a car. Thus anticipated noise would include noise due to weather conditions (such as the sound of rain or thunder), noise due to the traveling state of the vehicle (such as engine noise, noise of tires against the road, noise of wind due to an open window, or noise of passing cars and trucks), noise due to the traveling location of the vehicle (such as construction noise, urban traffic noise, or airport noise), and noise due to operational states of apparatuses mounted in the vehicle (such

as the sound of windshield wipers or of the fan, which may vary according to speed). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that Deng's method and apparatus, modified for use in a vehicle, would need to compensate for these noise types.

11. With respect to independent **claims 6 and 13**, Deng teaches a speech recognition apparatus for performing speech recognition within a vehicle having noise *(column 6, line 37, noisy environment may be a car; column 10, line 62, noisy environment may be an airplane)*, the apparatus comprising:

- a sound input device that inputs speech to be recognized and other noise *(figure 4, column 7, lines 17-19, microphone (404) inputs speech signal and additive noise)*;
- plural types of acoustic models created by the acoustic model creating method of claim 1 *(figure 4, acoustic model (418); column 12, lines 36-48, multiple acoustic models may be used. The method of model creation has been addressed in the discussion of claim 1 above.)*;
- a noise data determination device that determines which noise data of the plural types of noise data corresponds to the noise inputted from the sound input device *(figure 13, column 12, lines 6-16, noise comparator (1302) compares the noise in the signal to training noise stored in memory)*;
- a noise removal processing device that performs noise removal on the noise- superposed speech data on which the noise inputted from the sound input device are superposed based on the result of the determination of the noise data determination device *(figure 13,*

column 12, lines 17-35, noise reduction module (1306, 1308, or 1310) applies noise reduction technique); and

- a speech recognition device that performs speech recognition on the noise-removed speech data *(figure 4, column 7, lines 57-60 and column 8, lines 47-63, decoder (412) identifies the most likely sequence of words).*

12. With respect to **claims 2 and 8**, Deng teaches everything claimed, as applied above (see claims 1 and 6 respectively); in addition, Deng further teaches that the noise removal process performed on the plural types of noise-superposed speech data is carried out using a noise removal method suitable for each of the noise data *(column 11, lines 2-6, the noise reduction techniques applied to the training data can be the same for each type of noisy environment or may be tailored for the specific noise environment).*

13. With respect to **claims 5 and 11**, Deng teaches everything claimed, as applied above (see claims 1 and 6 respectively); in addition, Deng further teaches:

- collecting noise comprising a recording step of recording individual noise parameters corresponding to the plural types of noise to be collected *(column 6, lines 39-44, noise is recorded; column 10, line 57, multiple sets of training data are used; column 11, lines 9-11, each set of training data is associated with a different type of noise),*
- and the plural types of noise to be collected being classified using each noise parameter corresponding to the plural types of noise to be collected, thereby creating the plural

types of noise data *(column 11, lines 9-11, each set of training data is associated with a different type of noise).*

14. With respect to **claim 7**, Deng teaches everything claimed, as applied above (see claim 6); in addition, Deng further teaches a noise parameter acquisition device that acquires noise parameters corresponding to the noise inputted from the sound input device *(figure 13, column 12, lines 7-9, noise comparator (1302) uses the spectral content of the noise in identification of the noise).*

15. With respect to **claim 12**, Deng teaches everything applied above (see claim 6); in addition, Deng further teaches the same noise removal process being used at the time of creating the plural types of acoustic models and at the time of performing speech recognition *(figure 3, column 6, line 66 to column 7, line 3, the same noise reduction techniques that were applied to the noisy training data are then applied to the test data (308); figure 13, column 12, lines 17-28, for multiple types of noise, noise is identified and the same noise reduction techniques that were applied to the training data are applied to the test data).*

16. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deng et al. (US 6,876,966) as applied to claims 15 and 16 above, and further in view of Borth et al. (US 4,628,529).

17. With respect to **claims 17 and 18**, Deng teaches everything applied above (see claims 15 and 16), but Deng does not teach a method or apparatus "wherein the plural types of noise data is

represented by three levels in a 3-dimensional configuration". However, the examiner contends that this concept was well known in the art, as taught by Borth.

In similar field of endeavor, Borth teaches using three gain table sets, representing three different noise levels *(col. 11, lines 17-21)* in a noise suppression system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Deng's plural types of noise with Borth's technique of using different levels of noise in order to produce models more sharply defined to different noise environments, because different levels of even the same type of noise would constitute different noise environments.

18. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deng et al. (US 6,876,966) in view of Kishi et al. (US 4,501,012).

19. With respect to **claim 14**, Kishi discloses a speech recognition system for an automotive vehicle but does not specifically teach the speech recognition apparatus of claim 6 of this application. Instead, Kishi makes mention of a "typical speech recognizer."

Deng teaches the speech recognition apparatus of claim 6, as addressed above in the discussion of claim 6. Deng does not explicitly teach the placement of the speech recognition apparatus in a vehicle, but does identify a car and an airplane as possible noisy environments where the apparatus may be used *(column 10, lines 61-62)*.

As Kishi does not limit the type of speech recognition apparatus that may be used in the vehicle, and as Deng teaches vehicles as environments where a speech recognition apparatus may be used, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to have modified Kishi's vehicular speech recognition system with the speech recognition apparatus of Deng. Deng's speech recognition apparatus uses the method of training speech models by inserting noise followed by noise reduction and would afford more precision and accuracy than a generic speech recognition device because these models more closely match the testing data than other systems *(column 1, lines 35-64)*.

Conclusion

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gina W. Lee whose telephone number is (571) 270-3139. The examiner can normally be reached on Monday to Friday, 8:00 AM - 5:00 PM EST.

22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Art Unit 2626

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